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CLAIMS

[Claim(s)]

[Claim 1] The record or read-out to a dismountable record medium is possible in a file, and said file is set to a controllable digital camera by management information. A record-medium existence-or-nonexistence detection means to detect whether it is equipped with said record medium, The record-medium control means which controls said record medium, and a judgment means to judge a file arrangement format, It has a storing condition inspection means to inspect the storing condition of a current file, and a record-medium initialization means to initialize said record medium in the form of predetermined. Said record-medium existence-or-nonexistence detection means detects a record-medium attachment-and-detachment condition. By said record-medium control means At the time of record-medium insertion After checking that a power up is accessible to said record medium to said record medium, said record-medium internal information is acquired. Or with said judgment means The propriety diagnosis of said record-medium internal information and record-medium format condition which were acquired are judged. Inspect a file storing condition with said storing condition inspection means, and it constitutes so that it may use for future record-medium control from said acquired information and a file storing condition. When said record medium is initialized, The file control method of the record medium in the digital camera characterized by constituting so that it may initialize with said record-medium initialization means in the FAT format of the number of bits same when the record medium for initialization is smaller than a predetermined record-medium capacity, or the smaller number of bits.

[Claim 2] Said record medium is the file control method of the record medium in the digital camera according to claim 1 characterized by the dismountable thing.

[Claim 3] The file control method of the record medium in the digital camera according to claim 1 characterized by the FAT format of said same number of bits or the smaller number of bits being FAT12 format or FAT16 format.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the control system to the record media (card etc.) with which an electronic still (digital) camera is equipped.

[0002]

[Description of the Prior Art] The technique which records files, such as still picture data, a video data, and voice data, on removable memory is indicated. Many of record media generally used for a digital camera are based on DOS/FAT filesystem at the time of shipment. For this reason, a digital camera side also records the photoed image file on a record medium based on DOS/FAT filesystem. A camera user can also carry out the repeat display of the photoed image with the camera.

[0003] If the record medium is removable memory, it is also possible to insert to card slots, such as Note PC, directly. Moreover, if an image can be transmitted to PC from the camera, the photoed image file is displayed on PC screen, and a user can also edit a check and its image. When much photography is made and the residue of a record medium has decreased, a user can also eliminate an unnecessary image using the image elimination function of a camera. Moreover, with PC etc., by carrying out elimination of an image, and initialization (format actuation) of a record medium, again, the residue of a record medium is made to increase and many images can be recorded.

[0004]

[Problem(s) to be Solved by the Invention] In recent years, large capacity-ization of the removable memory (a "card" is called henceforth) which used the semi-conductor was progressing by advance of semiconductor technology, and, several years ago, as for less than 20MB of thing, there was much maximum capacity as storage capacity. However, in current, what reaches 100MB of maximum capacity number appears, and what exceeds 1GB as the maximum storage capacity further is announced and put on the market. On the other hand, according to buildup of the number of CCD pixels of a digital camera, the image is high definition more and 1 image file size is also becoming large. For this reason, when image size becomes large, it cannot necessarily record on a small capacity card. Conversely, many things which have a small image file can be recorded now on a mass card.

[0005] After the compatibility between a card, PC, PDA, etc. improving and initializing a card by these devices with the increment and spread of PC and various cards, the cases used with a digital camera are increasing in number. However, after initializing a card by these devices, even if it was returned to a digital camera, the digital camera side was not necessarily able to recognize the (initialized) card certainly. The main reason is as follows.

[0006] ** A card initialization method be different depending on the class of device. In some OS's (for example, MacPC (trademark of Apple Computer, Inc.) etc.), a format original with the OS exists and a card is initialized in a completely different format from DOS/FAT filesystem.

** If card initialization is carried out by the FAT32 method even if it is a card based on DOS / FAT file format, a digital camera [that it cannot respond] exists.

** Even if it is the card based on DOS/FAT filesystem, when it cannot respond to some values of the internal management information of a card, the digital camera judged to be unsuitable cards (for example, an "error card", "a non-formatted card", etc.) also exists. [0007] Then, even if it is the card of small capacity and is a mass card, implementation of the control system of the file of the digital camera in which a rear-spring-supporter response in a wide range capacity is possible is demanded. And even if it is the card initialized, for example by devices other than self, such as PC, PDA, and a camera of the other company, as for a digital camera side, it is desirable that it can be made a controlled system as much as possible. The object of this invention is to offer the file control method of a record medium so that it can respond to more digital cameras, when it can respond also to the card by which is accessible and card initialization was carried out with PC, PDA, and the camera of the other company and a digital camera carries out card initialization at reverse corresponding to the card of a wide range capacity of small capacity to large capacity.

[0008]

[Means for Solving the Problem] In order to attain said object, the file control method of the record medium in the digital camera by this invention The record or read-out to a dismountable record medium is possible in a file, and said file is set to a controllable digital camera by management information. A record-medium existence-or-nonexistence detection means to detect whether it is equipped with said record medium, The record-medium control means which controls said record medium, and a judgment means to judge a file arrangement format, It has a storing condition inspection means to inspect the storing condition of a current file, and a record-medium initialization means to initialize said record medium in the form of predetermined. Said record-medium existence-or-nonexistence detection means detects a record-medium attachment-and-detachment condition. By said record-medium control means At the time of record-medium insertion After checking that a power up is accessible to said record medium to said record medium, said record-medium internal information is acquired. Or with said judgment means The propriety diagnosis of said record-medium internal information and record-medium format condition which were acquired are judged. Inspect a file storing condition with said storing condition inspection means, and it constitutes so that it may use for future record-medium control from said acquired information and a file storing condition. When initializing said record medium, it is constituted so that it may initialize with said record-medium initialization means in the FAT format of the number of bits same when the record medium for initialization is smaller than a predetermined record-medium capacity, or the smaller number of bits. Moreover, said record medium in this invention is dismountable, and the FAT format of said same number of bits in this invention or the smaller number of bits uses FAT12 format or FAT16 format further.

[0009]

[Function] It is possible to correspond, even if initialized by the FAT32 method according to the above-mentioned configuration (card format). When carrying out a self-format (it initializes with a digital camera), it can respond to many cameras from that of the conventional model.

[0010]

[Embodiment of the Invention] The following, drawing It refers to and the gestalt of operation of this invention is explained in detail. Drawing 1 is the block diagram showing the gestalt of operation of the circuit of the digital camera which applied the file control method of the record medium by this invention. Photo electric translation of the light from a photographic subject is carried out by the image pick-up means 5 which makes CCD4 a part through the optical system of a lens 1, an iris 2, and a shutter 3. A/D conversion is made, after the signal by which photo electric translation was carried out is amplified and being sampled. And the storage 7, such as SDRAM, memorizes temporarily under control of a control processor 6.

[0011] The these-digitized image information is processed by the control processor 6 so that a display output may be possible on the LCD monitor 9 which is a display means, or an electronic viewfinder. a user pushes the release SW of the actuation SW section 10 in a shutter chance -- the above -- an image is captured by the same path and the almost same art, and it memorizes to storage 7 as the compression image file of a still picture, and an incompressible file. It is not necessary to necessarily use electronic view finder ability with the camera which has an optical finder for power saving.

[0012] A control processor 6 carries out an image processing and card control in each control phase. In record control, the image file memorized by the card 11 has completed the minimum check of operation at the time of wearing, and this image file can be recorded on a card 11. In playback control, after a control processor 6 reads an assignment image from a card 11 for the image file which is record settled to a card 11 at storage 7 depending on user actuation, such as a change of an actuation key, required processing can be performed and it can reproduce to the LCD monitor 9. Playback drawing may be displayed by piece delivery / return actuation of every one piece, and may perform a multi-drawing display. In addition, the playback drawing display in a first time display has many examples determined with product specification. In image elimination control, it has the function which initializes the elimination function and the card itself which eliminates an unnecessary image file by user actuation (format).

[0013] The file control method in this invention is realized by each function of card existence-or-nonexistence detecting-element 6a including the software control which a control processor 6 performs, card control-section 6b, card judging section 6c, 6d of storing condition Banking Inspection Department, and card initialization section 6e. First, as actuation of the 1st card access judging, a control processor 6 detects the wearing condition of a card by card existence-or-nonexistence detecting-element 6a, checks that the time of card insertion or the power up to a card, and a camera are accessible at worst, and acquires the information in a card. And if access is impossible, control of telling a user about this message will be performed.

[0014] If operations sequence is explained later on, the card wearing detecting signal of card existence-or-nonexistence detecting-element 6a will detect the switching condition of card covering (card slot covering), and the existence-or-nonexistence condition of a card. When a provision, i.e., a card, exists at least and covering fulfills the closed state, card control-section 6b of a control processor 6 connects a power source to a card. Card judging section 6c of a control processor 6 distinguishes whether minimum access is possible after the convention time amount progress after powering on to a card.

[0015] When minimum access is a CompactFlash (trademark of SanDisk Corporation) card, when it is SD card or MMC, it is assumed in the assertion (active) condition of a

READY signal that there is no response at the time of CMD0 issuance. That is, it is immediately after power-on that the initial response indication (or signal) from a card carries out a return check into convention time amount. If there is no return of an initial response indication, as for a control processor 6, this card will tell a user about the ability "not to access" with an error card display, an audible tone, etc. In addition, the card said here means what suits a camera physically and in electrical signal.

[0016] When the format condition of a propriety diagnosis of card internal information and a card acquired as actuation of the 2nd card access judging next is judged and it conforms to the format of the card, a file storing condition is further inspected in a card. That is, it controls as follows. When the initial response indication of a card is detected, card control-section 6b of a control processor 6 performs read-out control of the internal proper information on the card (or ID information). For example, in the case of CF card, CIS information and in SD/MMC, it is ID information. If card ID information can be read normally, it will judge with it being normal and 6d of storing condition Banking Inspection Department will acquire the management data region information on a card. If it judges with it being an unsuitable value among ID information or management data region information, an error message etc. will be performed as a card incongruent as access being impossible, or an error card, and a user will be told.

[0017] The user who has recognized the error message can check EJEKUTO (blowdown) of a card, and the result in reinsertion, or can do exchange actuation at another card. When it judges with the card of a digital camera being normal, judgment detection of this card-file arrangement format is carried out from card management data region information. That is, it judges whether it is FAT12, FAT16, or FAT32. A card is henceforth accessed by this judged method, and that content inspection is conducted after acquiring the information in a card in a card (for example, adjustable (idle status) of a file storing condition and a card etc.). In addition, especially FAT32 is a method used for a mass card etc. FAT12, FAT16, and the recognition approach of FAT32 each format are described by many technical books.

[0018] It can use now for future card control from the acquired management data region information, a file arrangement format, and file storing information. However, after control shifts to file record control, playback control, etc., when a card access error occurs in record of an image file, and read-out control, it is possible to tell a user about a certain error having occurred. For example, it is telling a user about a message, such as "a file's not having been read", "the file's having been unrecordable", and there "there being no response from a card", as some errors.

[0019] Drawing 2 is drawing for explaining the structure of the management domain in memory, and a file region. The party SHON table is stored in head sector 15a of a disk. When controlling a disk and a card, the file system of OS or digital cameras, such as PC, can ask for a boot sector from the party SHON information in a head sector (MBR; master boot record) etc., and can obtain the location of a FAT region or a root directory region, and the management information in a card from the information in a boot sector. In the case of a card, only 1 party SHON is usually supported. The card layout is realized from the management domain 15 and the file space 16. The management domain 15 consists of copy 15e of MBR15a, reservation field 15b, boot sector 15c, 15d of FAT regions, and a FAT region, and root directory entry 15f. A folder and file data are stored in the file region 16.

[0020] A card layout and each information on the area within management are determined by carrying out card initialization, such as PC/camera. However it may be the initialized card, if it is the card of the range which can respond, it will be required that digital cameras (or PC etc.) should correspond to the card. The relation between a sector and a cluster is described below. A card (record medium) is accessed per a sector or cluster. In many cases, a cluster consists of two or more sectors, and serves as a fundamental unit at the time of file processing. For example, an example of the relation of the cluster according to record medium in MS-DOS, a sector, and a byte count is shown below.

Record medium	A sector/cluster	A cutting tool/cluster	One side floppy (trademark) disk 1
512	Double-sided floppy disk 2	1024	PC/AT fixed disk 4
2048			[0021]

The content called the various information called BPB, a sector / track value, a head value, an OEM name, and a loader routine to the information in a boot sector is described, and size is usually 512 bytes. These information is used by the software which controls a card.

[0022] FAT and file storing are explained below. A file is stored in a file space. A file is stored per allocation (or cluster unit). When one cluster is constituted per a small number of sector, the image file of big size needs many clusters. The FAT region has described where [of a file region] the file (or folder) is stored.

[0023] Drawing 3 is drawing for explaining the processing about a file access. A file body is recorded on a file space. Next, the information which shows on what cluster in a file space the file concerned was arranged and recorded is recorded on a FAT region. Directory entry information consists of information, such as a file name, an extension, attribute information, and a reservation region, an initiation cluster, and a file size. The initiation cluster information which shows where [of a file region] the file concerned is stored in some fields of this directory entry information from is recorded. Furthermore, information, such as a file size, a file name, and an extension, is also simultaneously recorded on this entry information.

[0024] Next drawing 4 is used and card initialization is explained. It is shown whether each field which drawing 4 shows cluster size in the direction of an axis of ordinate, shows card capacity in the direction of an axis of abscissa, respectively, and is shown by the axis of ordinate and the axis of abscissa belongs for any of FAT 12 and 16 and 32 formats being with the combination of cluster size and card capacity. Line A is the boundary of FAT 12 and 16, and Line B is the boundary of FAT 16 and 32. For example, if f one-line (card capacity is 16MB) top is seen, it can initialize in one location of the locations of (A), (B), and (C). (A) is a location whose cluster size is 1024 bytes in FAT16 by the card capacity of 16MB, (B) is a location whose cluster size is 16384 bytes in FAT12 by the card capacity of 16MB, and (C) is a location whose cluster size is 65536 bytes in FAT12 by the card capacity of 16MB. Hereafter, the location of (A), (B), and (C) is similarly shown, respectively about f2 line (card capacity is 128MB), f3 line (card capacity is 2048MB), and f4 line (card capacity is more than 8G).

[0025] By the file control method by this invention, when a camera performs card initialization, PC etc. does not become the same as the file format which carries out card initialization. card initialization section 6e in drawing 1 -- bit with the more equivalent camera format by the same card capacity -- a number or fewer bit -- he is trying to constitute, as a number shows the number of clusters For example, when PC formats 64MB of card, card initialization is possible for PC in a FAT32 format, but with the

digital camera by this invention, to a card with a capacity [this] of 64MB, even if many, it initializes in FAT16 format.

[0026] This is tested by comparison, when f1, f2, f3, and f4 line, i.e., card capacity, are 16MB, 128MB, 2048MB, and 8GB or more. Although it can initialize by (A), (B), and (C) with a digital camera if f1 line is observed, it initializes by (C) or (B), i.e., FAT12 format, by the file control method by this invention. Although it can initialize by (A), (B), and (C) with a digital camera if 128MB of f2 line is observed next, it initializes in the file control method by this invention in (C), (B)12, i.e., FAT, or FAT16 format.

Subsequently, although it can initialize by (A), (B), and (C) with a digital camera if 2048MB of f3 line is observed, it initializes by (C, i.e., FAT16 format) by the file control method by this invention. If 8GB or more of f4 line is furthermore observed, by the file control method by this invention, it will initialize in a FAT32 format. In addition, card initialization [in / in the range corresponding to a FAT32 format / PC] corresponds to 64MB or more, and a camera (card initialization with a camera) corresponds from the capacity of 512MB or more.

[0027]

[Effect of the Invention] As mentioned above, according to this invention, as explained, even if it is the card of small capacity and is a mass card, the file control method of the record medium of the digital camera which can respond can be offered. Moreover, when it can respond even if card initialization is carried out with PC etc., and a camera performs a card format, the file control method of the high card of versatility can be offered by carrying out card control so that it may correspond to more cameras.

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TECHNICAL FIELD

[Field of the Invention] This invention relates to the control system to the record media (card etc.) with which an electronic still (digital) camera is equipped.

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PRIOR ART

[Description of the Prior Art] The technique which records files, such as still picture data, a video data, and voice data, on removable memory is indicated. Many of record media generally used for a digital camera are based on DOS/FAT filesystem at the time of shipment. For this reason, a digital camera side also records the photoed image file on a record medium based on DOS/FAT filesystem. A camera user can also carry out the repeat display of the photoed image with the camera.

[0003] If the record medium is removable memory, it is also possible to insert to card slots, such as Note PC, directly. Moreover, if an image can be transmitted to PC from the camera, the photoed image file is displayed on PC screen, and a user can also edit a check and its image. When much photography is made and the residue of a record medium has decreased, a user can also eliminate an unnecessary image using the image elimination function of a camera. Moreover, with PC etc., by carrying out elimination of an image, and initialization (format actuation) of a record medium, again, the residue of a record medium is made to increase and many images can be recorded.

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EFFECT OF THE INVENTION

[Effect of the Invention] As mentioned above, according to this invention, as explained, even if it is the card of small capacity and is a mass card, the file control method of the record medium of the digital camera which can respond can be offered. Moreover, when it can respond even if card initialization is carried out with PC etc., and a camera performs a card format, the file control method of the high card of versatility can be offered by carrying out card control so that it may correspond to more cameras.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] In recent years, large capacity-ization of the removable memory (a "card" is called henceforth) which used the semi-conductor was progressing by advance of semiconductor technology, and, several years ago, as for less than 20MB of thing, there was much maximum capacity as storage capacity. However, in current, what reaches 100MB of maximum capacity number appears, and what exceeds 1GB as the maximum storage capacity further is announced and put on the market. On the other hand, according to buildup of the number of CCD pixels of a digital camera, the image is high definition more and 1 image file size is also becoming large. For this reason, when image size becomes large, it cannot necessarily record on a small capacity card. Conversely, many things which have a small image file can be recorded now on a mass card.

[0005] After the compatibility between a card, PC, PDA, etc. improving and initializing a card by these devices with the increment and spread of PC and various cards, the cases used with a digital camera are increasing in number. However, after initializing a card by these devices, even if it was returned to a digital camera, the digital camera side was not necessarily able to recognize the (initialized) card certainly. The main reason is as follows.

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** If card initialization is carried out by the FAT32 method even if it is a card based on DOS / FAT file format, a digital camera [that it cannot respond] exists.

** Even if it is the card based on DOS/FAT filesystem, when it cannot respond to some values of the internal management information of a card, the digital camera judged to be unsuitable cards (for example, an "error card", "a non-formatted card", etc.) also exists.

[0007] Then, even if it is the card of small capacity and is a mass card, implementation of the control system of the file of the digital camera in which a rear-spring-supporter response in a wide range capacity is possible is demanded. And even if it is the card initialized, for example by devices other than self, such as PC, PDA, and a camera of the other company, as for a digital camera side, it is desirable that it can be made a controlled

system as much as possible. The object of this invention is to offer the file control method of a record medium so that it can respond to more digital cameras, when it can respond also to the card by which is accessible and card initialization was carried out with PC, PDA, and the camera of the other company and a digital camera carries out card initialization at reverse corresponding to the card of a wide range capacity of small capacity to large capacity.

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MEANS

[Means for Solving the Problem] In order to attain said object, the file control method of the record medium in the digital camera by this invention The record or read-out to a dismountable record medium is possible in a file, and said file is set to a controllable digital camera by management information. A record-medium existence-or-nonexistence detection means to detect whether it is equipped with said record medium, The record-medium control means which controls said record medium, and a judgment means to judge a file arrangement format, It has a storing condition inspection means to inspect the storing condition of a current file, and a record-medium initialization means to initialize said record medium in the form of predetermined. Said record-medium existence-or-nonexistence detection means detects a record-medium attachment-and-detachment condition. By said record-medium control means At the time of record-medium insertion After checking that a power up is accessible to said record medium to said record medium, said record-medium internal information is acquired. Or with said judgment means The propriety diagnosis of said record-medium internal information and record-medium format condition which were acquired are judged. Inspect a file storing condition with said storing condition inspection means, and it constitutes so that it may use for future record-medium control from said acquired information and a file storing condition. When initializing said record medium, it is constituted so that it may initialize with said record-medium initialization means in the FAT format of the number of bits same when the record medium for initialization is smaller than a predetermined record-medium capacity, or the smaller number of bits. Moreover, said record medium in this invention is dismountable, and the FAT format of said same number of bits in this invention or the smaller number of bits uses FAT12 format or FAT16 format further.

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OPERATION

[Function] It is possible to correspond, even if initialized by the FAT32 method according to the above-mentioned configuration (card format). When carrying out a self-format (it initializes with a digital camera), it can respond to many cameras from that of the conventional model.

[0010]

[Embodiment of the Invention] The following, drawing It refers to and the gestalt of operation of this invention is explained in detail. Drawing 1 is the block diagram showing the gestalt of operation of the circuit of the digital camera which applied the file control method of the record medium by this invention. Photo electric translation of the light from a photographic subject is carried out by the image pick-up means 5 which makes CCD4 a part through the optical system of a lens 1, an iris 2, and a shutter 3. A/D conversion is made, after the signal by which photo electric translation was carried out is amplified and being sampled. And the storage 7, such as SDRAM, memorizes temporarily under control of a control processor 6.

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[0012] A control processor 6 carries out an image processing and card control in each control phase. In record control, the image file memorized by the card 11 has completed the minimum check of operation at the time of wearing, and this image file can be recorded on a card 11. In playback control, after a control processor 6 reads an assignment image from a card 11 for the image file which is record settled to a card 11 at storage 7 depending on user actuation, such as a change of an actuation key, required processing can be performed and it can reproduce to the LCD monitor 9. Playback drawing may be displayed by piece delivery / return actuation of every one piece, and may perform a multi-drawing display. In addition, the playback drawing display in a first time display has many examples determined with product specification. In image elimination control, it has the function which initializes the elimination function and the card itself which eliminates an unnecessary image file by user actuation (format).

[0013] The file control method in this invention is realized by each function of card existence-or-nonexistence detecting-element 6a including the software control which a control processor 6 performs, card control-section 6b, card judging section 6c, 6d of storing condition Banking Inspection Department, and card initialization section 6e. First, as actuation of the 1st card access judging, a control processor 6 detects the wearing condition of a card by card existence-or-nonexistence detecting-element 6a, checks that the time of card insertion or the power up to a card, and a camera are accessible at worst, and acquires the information in a card. And if access is impossible, control of telling a user about this message will be performed.

[0014] If operations sequence is explained later on, the card wearing detecting signal of card existence-or-nonexistence detecting-element 6a will detect the switching condition of card covering (card slot covering), and the existence-or-nonexistence condition of a card. When a provision, i.e., a card, exists at least and covering fulfills the closed state, card control-section 6b of a control processor 6 connects a power source to a card. Card judging section 6c of a control processor 6 distinguishes whether minimum access is possible after the convention time amount progress after powering on to a card.

[0015] When minimum access is a CompactFlash (trademark of SanDisk Corporation) card, when it is SD card or MMC, it is assumed in the assertion (active) condition of a READY signal that there is no response at the time of CMD0 issuance. That is, it is immediately after power-on that the initial response indication (or signal) from a card carries out a return check into convention time amount. If there is no return of an initial response indication, as for a control processor 6, this card will tell a user about the ability "not to access" with an error card display, an audible tone, etc. In addition, the card said here means what suits a camera physically and in electrical signal.

[0016] When the format condition of a propriety diagnosis of card internal information and a card acquired as actuation of the 2nd card access judging next is judged and it conforms to the format of the card, a file storing condition is further inspected in a card. That is, it controls as follows. When the initial response indication of a card is detected, card control-section 6b of a control processor 6 performs read-out control of the internal proper information on the card (or ID information). For example, in the case of CF card, CIS information and in SD/MMC, it is ID information. If card ID information can be read normally, it will judge with it being normal and 6d of storing condition Banking Inspection Department will acquire the management data region information on a card. If it judges with it being an unsuitable value among ID information or management data region information, an error message etc. will be performed as a card incongruent as access being impossible, or an error card, and a user will be told.

[0017] The user who has recognized the error message can check EJECT (blowdown) of a card, and the result in reinsertion, or can do exchange actuation at another card. When it judges with the card of a digital camera being normal, judgment detection of this card-file arrangement format is carried out from card management data region information. That is, it judges whether it is FAT12, FAT16, or FAT32. A card is henceforth accessed by this judged method, and that content inspection is conducted after acquiring the information in a card in a card (for example, adjustable (idle status) of a file storing condition and a card etc.). In addition, especially FAT32 is a method used for a mass card etc. FAT12, FAT16, and the recognition approach of FAT32 each format are described by many technical books.

[0018] It can use now for future card control from the acquired management data region information, a file arrangement format, and file storing information. However, after control shifts to file record control, playback control, etc., when a card access error occurs in record of an image file, and read-out control, it is possible to tell a user about a certain error having occurred. For example, it is telling a user about a message, such as "a file's not having been read", "the file's having been unrecordable", and there "there being no response from a card", as some errors.

[0019] Drawing 2 is drawing for explaining the structure of the management domain in memory, and a file region. The party SHON table is stored in head sector 15a of a disk. When controlling a disk and a card, the file system of OS or digital cameras, such as PC, can ask for a boot sector from the party SHON information in a head sector (MBR; master boot record) etc., and can obtain the location of a FAT region or a root directory region, and the management information in a card from the information in a boot sector. In the case of a card, only 1 party SHON is usually supported. The card layout is realized from the management domain 15 and the file space 16. The management domain 15 consists of copy 15e of MBR 15a, reservation field 15b, boot sector 15c, 15d of FAT regions, and a FAT region, and root directory entry 15f. A folder and file data are stored in the file region 16.

[0020] A card layout and each information on the area within management are determined by carrying out card initialization, such as PC/camera. However it may be the initialized card, if it is the card of the range which can respond, it will be required that digital cameras (or PC etc.) should correspond to the card. The relation between a sector and a cluster is described below. A card (record medium) is accessed per a sector or cluster. In many cases, a cluster consists of two or more sectors, and serves as a fundamental unit at the time of file processing. For example, an example of the relation of the cluster according to record medium in MS-DOS, a sector, and a byte count is shown below.

Record medium A sector/cluster A cutting tool/cluster One side floppy (trademark) disk 1 512 Double-sided floppy disk 2 1024 PC/AT fixed disk 4 2048 [0021] The content called the various information called BPB, a sector / track value, a head value, an OEM name, and a loader routine to the information in a boot sector is described, and size is usually 512 bytes. These information is used by the software which controls a card.

[0022] FAT and file storing are explained below. A file is stored in a file space. A file is stored per allocation (or cluster unit). When one cluster is constituted per a small number of sector, the image file of big size needs many clusters. The FAT region has described where [of a file region] the file (or folder) is stored.

[0023] Drawing 3 is drawing for explaining the processing about a file access. A file body is recorded on a file space. Next, the information which shows on what cluster in a file space the file concerned was arranged and recorded is recorded on a FAT region. Directory entry information consists of information, such as a file name, an extension, attribute information, and a reservation region, an initiation cluster, and a file size. The initiation cluster information which shows where [of a file region] the file concerned is stored in some fields of this directory entry information from is recorded. Furthermore, information, such as a file size, a file name, and an extension, is also simultaneously recorded on this entry information.

[0024] Next drawing 4 is used and card initialization is explained. It is shown whether

each field which drawing 4 shows cluster size in the direction of an axis of ordinate, shows card capacity in the direction of an axis of abscissa, respectively, and is shown by the axis of ordinate and the axis of abscissa belongs for any of FAT 12 and 16 and 32 formats being with the combination of cluster size and card capacity. Line A is the boundary of FAT 12 and 16, and Line B is the boundary of FAT 16 and 32. For example, if f one-line (card capacity is 16MB) top is seen, it can initialize in one location of the locations of (A), (B), and (C). (A) is a location whose cluster size is 1024 bytes in FAT16 by the card capacity of 16MB, (B) is a location whose cluster size is 16384 bytes in FAT12 by the card capacity of 16MB, and (C) is a location whose cluster size is 65536 bytes in FAT12 by the card capacity of 16MB. Hereafter, the location of (A), (B), and (C) is similarly shown, respectively about f2 line (card capacity is 128MB), f3 line (card capacity is 2048MB), and f4 line (card capacity is more than 8G).

[0025] By the file control method by this invention, when a camera performs card initialization, PC etc. does not become the same as the file format which carries out card initialization. card initialization section 6e in drawing 1 -- bit with the more equivalent camera format by the same card capacity -- a number or fewer bit -- he is trying to constitute, as a number shows the number of clusters For example, when PC formats 64MB of card, card initialization is possible for PC in a FAT32 format, but with the digital camera by this invention, to a card with a capacity [this] of 64MB, even if many, it initializes in FAT16 format.

[0026] This is tested by comparison, when f1, f2, f3, and f4 line, i.e., card capacity, are 16MB, 128MB, 2048MB, and 8GB or more. Although it can initialize by (A), (B), and (C) with a digital camera if f1 line is observed, it initializes by (C) or (B), i.e., FAT12 format, by the file control method by this invention. Although it can initialize by (A), (B), and (C) with a digital camera if 128MB of f2 line is observed next, it initializes in the file control method by this invention in (C), (B)12, i.e., FAT, or FAT16 format.

Subsequently, although it can initialize by (A), (B), and (C) with a digital camera if 2048MB of f3 line is observed, it initializes by (C, i.e., FAT16 format) by the file control method by this invention. If 8GB or more of f4 line is furthermore observed, by the file control method by this invention, it will initialize in a FAT32 format. In addition, card initialization [in / in the range corresponding to a FAT32 format / PC] corresponds to 64MB or more, and a camera (card initialization with a camera) corresponds from the capacity of 512MB or more.

[Translation done.]

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
 2. **** shows the word which can not be translated.
 3. In the drawings, any words are not translated.
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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the block diagram showing the gestalt of operation of the circuit of the digital camera which applied the file control method of the record medium by this invention.

[Drawing 2] It is drawing for explaining the structure of the management domain in memory, and a file region.

[Drawing 3] It is drawing for explaining the processing about a file access.

[Drawing 4] It is drawing for explaining the relation between a cluster value, a sector value, and a byte-count value.

[Description of Notations]

1 Lens

2 Iris

3 Shutter

4 CCD

5 Image Pick-up Means

6 Control Processor

6a Card existence-or-nonexistence detecting element

6b Card control section

6c Card judging section

6d Storing condition Banking Inspection Department

6e Card initialization section

7 Storage

9 LCD Monitor

10 The Actuation SW Section

11 Card (Memory)

15 Management Domain

16 File Region (File Space)

[Translation done.]

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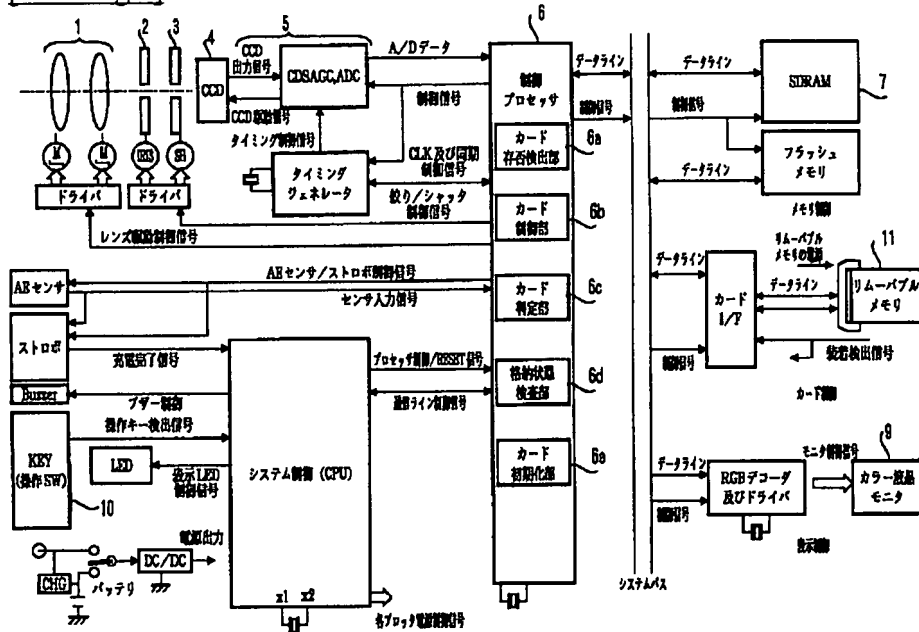
1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.**** shows the word which can not be translated.

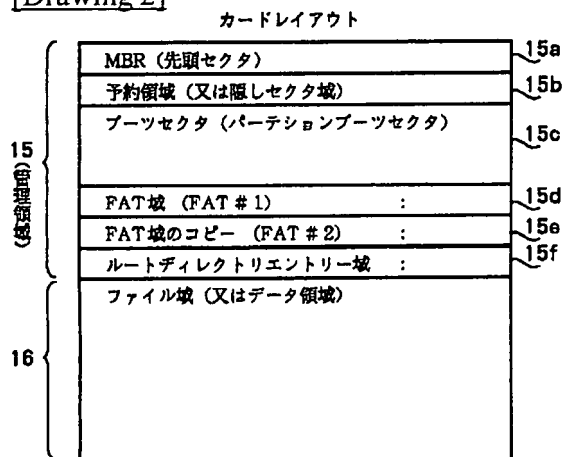
3.In the drawings, any words are not translated.

DRAWINGS

[Drawing 1]



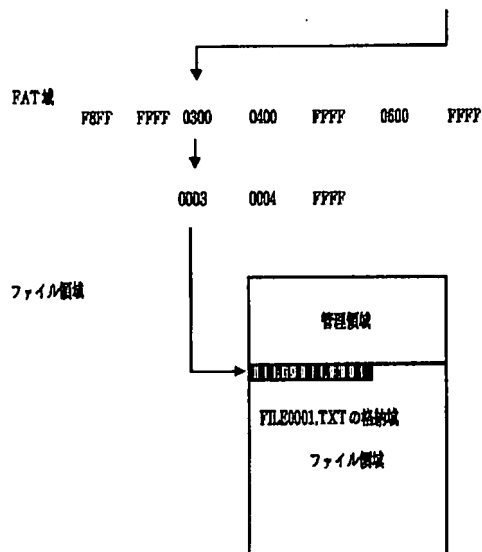
[Drawing 2]



[Drawing 3]

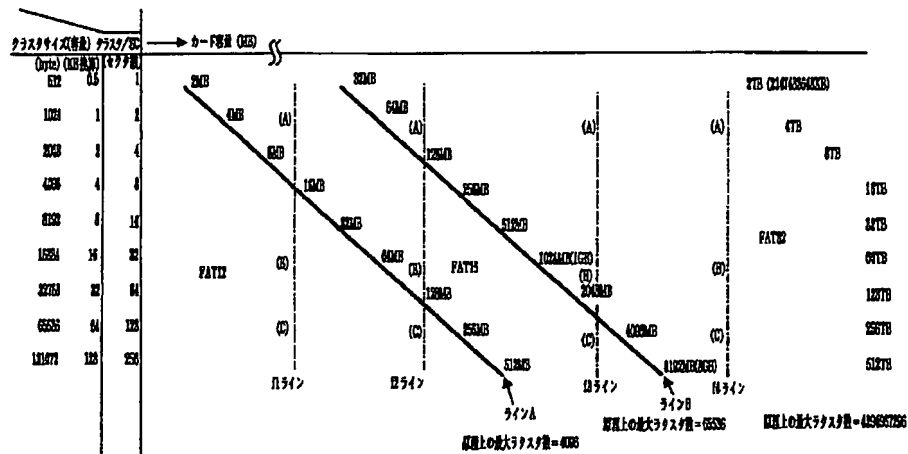
ディレクトリエントリ域の情報

ファイル名	拡張子	属性情報、予約域等情報	開始クラス	ファイルサイズ
FILE0001	TXT	XX...XX	0200	XXXX



[Drawing 4]

DOS/FAT方式クラスター値-カード容量対応イメージ図



[Translation done.]